

Claims

- [c1] 1.A method of processing image data of a scanned object, the method comprising:
performing, in integer format, a pixel offset correction on the image data using unsigned saturation arithmetic to produce an image in integer format having negative value pixels clipped to a value of zero;
converting the resulting pixels to floating point format and multiplying the converted pixels by a positive floating point gain factor;
converting the resulting pixels to integer format and clamping the converted pixel values to a maximum value using saturation arithmetic;
performing, in integer format, non-functional pixel correction and clamping the resulting pixel values to a maximum value using saturation arithmetic; and
mapping in integer format the resulting pixel value to a palette index using a lookup table to establish an output pixel intensity having one of a plurality of intensity levels.
- [c2] 2.The method of claim 1 wherein said mapping in integer format the resulting pixel value to a palette index

using a lookup table further comprises:
using a single lookup table incorporating both contrast management and gamma correction to map the integer resulting pixel to an 8-bit gray scale image, so as to avoid a posterization effect produced by using separate lookup tables.

[c3] 3.The method of claim 1, wherein:
said performing a pixel offset correction comprises performing a dark image pixel subtraction from said image data; and
said mapping the resulting pixel value to a palette index comprises mapping via a lookup table.

[c4] 4.The method of claim 3, wherein:
said integer format, said dark image, and the radiographic image are in 16-bit integer format;
said dark image is acquired in the absence of radiation;
said floating point format and said gain factor are in 32-bit floating point format;
said gain factor is acquired from a normalization table;
said clamped pixel values are clamped to a minimum value of 0;
said palette index is in 8-bit integer format; and
said plurality of intensity levels includes at least 256 shades of gray.

- [c5] 5.The method of claim 1, further comprising:
filtering the mapped image data to enhance feature
recognition within the thickness range of the scanned
object; and
displaying the filtered radiographic image in real-time at
a frame rate of equal to or greater than 30 million pixels
per second.
- [c6] 6.The method of claim 1, wherein the image data is
medical image data obtained from scanning a patient.
- [c7] 7.The method of claim 1, wherein:
said performing a pixel offset correction, said converting
the resulting pixels to floating point format and multi-
plying the converted pixels by a positive floating point
gain factor, and said converting the resulting pixels to
integer format are implemented through multiple itera-
tions over a defined group of pixels so as to maximize
cache performance.
- [c8] 8.A computer program article for processing image data
of scanned object, the article comprising:
a storage medium, readable by a commercial off the
shelf processing circuit, including instructions for execu-
tion by the processing circuit for:
performing, in integer format, a pixel offset correction
on the image data using a dark image subtraction and

saturation arithmetic to produce an image in integer format having negative value pixels clipped to a value of zero;

converting the resulting pixels to floating point format and multiplying the converted pixels by a gain factor;

converting the resulting pixels to integer format and clamping the converted pixel values to a maximum value using saturation arithmetic;

performing, in integer format, non-functional pixel correction and clamping the resulting pixel values to a maximum value using saturation arithmetic;

mapping in integer format the resulting pixel value to a palette index to establish an output pixel intensity having one of a plurality of intensity levels;

filtering the mapped image data to enhance feature recognition within the thickness range of the scanned object; and

displaying the filtered image data in real-time at a frame rate of equal to or greater than 30 million pixels per second.

- [c9] 9. The article of claim 8, wherein:
- said performing a pixel offset correction comprises performing a dark image pixel subtraction from the radiographic image;
- said integer format, said dark image, and said radio-

graphic image are in 16-bit integer format;
said floating point format and said gain factor are in
32-bit floating point format;
said clamped pixel values are clamped to a 16 bit range
and not allowed to wrap;
said palette index is in 8-bit integer format; and
said plurality of intensity levels includes at least 256
shades of gray.

- [c10] 10. The article of claim 9, wherein the storage medium further includes instructions for execution by the processing circuit for:
performing, in floating point format, weighted averaging on the gain-multiplied pixels prior to converting the pixels to integer format and performing the non-functional pixel correction;
wherein said mapping the resulting pixel value to a palette index comprises mapping via a lookup table; and
wherein said gain factor is acquired from a normalization table.
- [c11] 11. The article of claim 8, wherein the image data is medical image data obtained from scanning a patient.
- [c12] 12. The article of claim 8, wherein:
said performing a pixel offset correction, said converting the resulting pixels to floating point format and multi-

plying the converted pixels by a positive floating point gain factor, and said converting the resulting pixels to integer format are implemented through multiple iterations over a defined group of pixels so as to maximize cache performance.

- [c13] 13.A medical imaging system, comprising:
- an image device adapted to acquire and output image data;
 - an imaging system controller in communication with said image device, said imaging system controller configured to receive commands from a computer; and
 - a display device for displaying said image data;
- said computer further includes a processor programmed for:
- performing, in integer format, a pixel offset correction on the image data using saturation arithmetic to produce an image in integer format having negative value pixels clipped to a value of zero;
 - converting the resulting pixels to floating point format and multiplying the converted pixels by a gain factor;
 - converting the resulting pixels to integer format and clamping the converted pixel values to a maximum value using saturation arithmetic;
 - performing, in integer format, non-functional pixel correction and clamping the resulting pixel values to a

maximum value using saturation arithmetic;
filtering the mapped image data to enhance feature recognition within the thickness range of the scanned object;
mapping, in integer format, the resulting pixel value to a palette index to establish an output pixel intensity having one of a plurality of intensity levels; and
displaying, on said display device, the filtered image data in real-time at a frame rate of equal to or greater than 30 million pixels per second.

[c14] 14.The system of claim 13, wherein:
said performing a pixel offset correction comprises performing a dark image pixel subtraction from the image data;
said integer format and the image data are in 16-bit integer format;
said floating point format and said gain factor are in 32-bit floating point format;
said clamped pixel values are clamped to a 16 bit range and not allowed to wrap;
said palette index is in 8-bit integer format; and
said plurality of intensity levels comprises at least 256 shades of gray.

[c15] 15.The system of Claim 14, wherein the processor is further programmed for:

performing, in floating point format, weighted averaging on the gain-multiplied pixels prior to converting the pixels to integer format and performing the non-functional pixel correction;

wherein the mapping the resulting pixel value to a palette index comprises mapping via a lookup table; and wherein the gain factor is acquired from a normalization table.

- [c16] 16.The system of claim 15, wherein:
said performing a pixel offset correction, said converting the resulting pixels to floating point format and multiplying the converted pixels by a positive floating point gain factor, said performing weighted averaging of the gain multiplied pixels in floating point format, and said converting the resulting pixels to integer format are implemented through multiple iterations over a defined group of pixels so as to maximize cache performance.
- [c17] 17.The system of claim 13, wherein said image device comprises one of: a radiographic device, a computed tomography device and a magnetic resonance device.
- [c18] 18.The system of claim 17, wherein the image data is medical image data obtained from scanning a patient.
- [c19] 19.The system of claim 13, wherein:

said performing a pixel offset correction, said converting the resulting pixels to floating point format and multiplying the converted pixels by a positive floating point gain factor, and said converting the resulting pixels to integer format are implemented through multiple iterations over a defined group of pixels so as to maximize cache performance.